

Highway 101 Greenbrae/Twin Cities Corridor Improvement Project

TAM Traffic Summary – September 2009

Existing Conditions

The section of Highway 101 between Tamalpais Drive and Sir Francis Drake Boulevard is one of the most congested freeway segments in the Bay Area. When the freeway is congested, local streets in Corte Madera and Larkspur are also affected. Due to high traffic volumes and closely spaced ramps, the freeway has a higher than average collision rate. The Highway 101 Greenbrae/Twin Cities Corridor Improvement Project seeks to address these issues. Table 1 shows existing weekday peak hour traffic volumes on study area local roadways.

Forecast Traffic Increase by 2035

In the next 25 years, on average, US-101 mainline traffic demand is expected to increase by approximately 40 to 60 percent by 2035, while local street traffic is expected to increase by roughly 30 to 50 percent. While most of the increase in local traffic would be attributed to expected population and employment growth, some increase would result from trips diverted from the freeway due to congestion.

Year 2035 No Project Conditions

Under the No Project conditions, where the existing road network remains in place in 2035, the increased traffic is forecasted to exceed the capacity of the existing roadway system at many locations within the study area. Table 1 shows that all of the roadway segments within the Greenbrae corridor would experience substantial increases in forecasted traffic. Increased demand would lead to additional congestion along these corridors. Table 2 indicates the average intersections delay at select locations within the corridor.

Year 2035 with Project Conditions

Construction of the Proposed Project would have the following effects on traffic patterns within the corridor:

Northbound – The project would add a northbound on and off-ramp at Wornum Drive. This would eliminate the existing short "hook" ramps at Industrial Way and reduce congestion on Redwood Highway north of Wornum Drive. Table 1 shows that demand volumes along Redwood Highway would decrease to a level similar to existing conditions.

Southbound – The project would create "braided" ramps at Fifer Avenue/Wornum Drive and as part of a potential later phase, reconstruct the Tamalpais Drive Interchange. The on-ramp would remain at Fifer Avenue while the off-ramp would be moved to Wornum Drive. As part of the potential reconstruction of the Tamalpais Interchange, the southbound Madera Boulevard ramps would be closed and access would be provided through a frontage road from Wornum to Madera. While these improvements would increase southbound traffic on Tamal Vista Drive from Fifer Avenue to Wornum Drive, travel speeds on these streets are expected to remain unchanged or slightly increase due to proposed local roadway and intersection enhancements (Table 3). The frontage road connecting Wornum Drive to Tamalpais Drive would reduce traffic on Madera Boulevard north of Tamalpais Drive by providing parallel access to the Corte Madera Town Centre and the US-101 ramps at the reconfigured Tamalpais Drive interchange.

Overall traffic circulation and access would improve within Corte Madera and Larkspur due to the completion of the proposed project. As shown in Table 2, key intersections within the Greenbrae corridor would operate similar to or better than under the No-Build scenario. Table 4 defines Level of Service as it relates to the studied intersections. Table 3 shows that average vehicle speeds within the corridor would improve in both the morning and evening peak commute periods for trips made along US-101 as well as on local streets.

TABLE 1 PEAK PERIOD TWO-WAY TRAFFIC VOLUMES ON LOCAL STREETS

	Existing		2035 No-Build		2035 Proposed Project	
Roadway Segment	AM	PM	AM	PM	AM	PM
Redwood Highway North of Wornum Drive	820	1,120	1,600	1,600	1,100	1,200
Redwood Highway South of Wornum Drive	270	700	900	1,200	900	1,000
Wornum Drive West of US-101	790	870	1,500	1,400	1,800	1,600
Tamal Vista Boulevard North of Wornum Drive	920	1,130	1,600	1,700	1,900	2,000
Tamal Vista Boulevard South of Wornum Drive	440	920	900	1,200	1,200	1,200
Madera Boulevard /US-101 SB Ramps	470	630	800	800	1,000	700
Madera Boulevard North of Tamalpais Drive	750	920	1,200	1,200	600	800
Tamalpais Drive over US-101	2,400	1,910	3,900	3,800	3,800	3,700

Source: Fehr & Peers, 2009

TABLE 2 STUDY AREA INTERSECTION LEVELS OF SERVICE FOR LOCAL STREET INTERSECTIONS (DRAFT RESULTS) YEAR 2035

	No-Build (LOS/Delay ¹)		Proposed Project (LOS/Delay ¹)		
Intersection	AM	PM	AM	PM	
Tamal Vista Blvd / Fifer Ave	D / 50	D / 45	C / 25	C / 30	
Tamal Vista Blvd / Wornum Dr	B / 15	C / 30	A/B / 10	B / 15	
Madera Blvd / Tamalpais Dr	D / 40	C / 30	D / 40	C / 30	
Tamalpais Dr / US-101 SB Ramps	B/C / 20	B / 15	B/C / 20	B / 15	

Note:

 Average control delay in seconds per vehicle and corresponding LOS for signalized intersections. Results based on the average of ten of twenty traffic simulation model runs with different random seed numbers.

Source: Fehr & Peers, 2009

TABLE 3 AVERAGE VEHICLE SPEEDS ON LOCAL STREETS AND US-101 (DRAFT RESULTS) YEAR 2035

Segment	No-Build (mph) ¹	Proposed Project (mph) ¹	
US-101 Segments			
Southbound - Sir Francis Drake/Bon Air Road to US-101 at Tamalpais	15 – 20 <i>(AM)</i>	15 <i>(AM)</i>	
Northbound - US-101 at Tamalpais to Eliseo	20 (PM)	25 – 30 <i>(PM)</i>	
Local Streets			
Southbound - Tamal Vista/Fifer to Tamalpais	35 <i>(AM)</i>	35 (AM)	
Northbound - Doherty to NB US-101	5 – 10 <i>(PM)</i>	20 (PM)	

Note:

 Vehicle speeds are based on the average of ten of twenty traffic simulation model runs with different random seed numbers.

Source: Fehr & Peers, May 2009

Intersection Level of Service Definition

The LOS of an intersection is a description of the quality of an intersection's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Table 4 summarizes the relationship between the average control delay per vehicle and LOS for signalized and unsignalized intersections.

At signalized intersections, the LOS rating is based on the weighted average control delay of all movements measured in seconds per vehicle. Peak hour traffic volumes, lane configurations, and signal timing plans are used as inputs in the LOS calculations. At side-street stop-controlled intersections, the LOS rating is based on the control delay of the worst case minor street movement. For all-way stop-controlled intersections, the LOS rating is based on the weighted average control delay of all movements.

TABLE 4 INTERSECTION LEVEL OF SERVICE DEFINITIONS FOR HCM METHODOLOGY					
Level of Service	Description of Traffic Conditions	Average Control Delay Per Vehicle (Seconds)			
Signalized Intersections					
А	Insignificant Delays: No approach phase is fully utilized and no vehicle waits longer than one red indication.	<u>≤</u> 10			
В	Minimal Delays: An occasional approach phase is fully utilized. Drivers begin to feel restricted.	>10-20			
С	Acceptable Delays: Major approach phase may become fully utilized. Most drivers feel somewhat restricted.	>20-35			
D	Tolerable Delays: Drivers may wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	>35-55			
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues form upstream.	>55-80			
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	>80			
Source: Highway Capacity Manual, Special Report 209, and Transportation Research Board, 2000.					